



A Dean

# LANGE'S HANDBOOK OF CHEMISTRY

## Thirteenth Edition

# LANGE'S HANDBOOK OF CHEMISTRY

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Chemistry

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## Section 9

Table 9-1 (Continued)  
ELEMENTS AND INORGANIC COMPOUNDS

Formula and Description	State	$\Delta H_f^\circ$	$\Delta G_f^\circ$	$S^\circ$	$G_f^\circ$
KBr <sub>2</sub>	aq	-91.49	-92.29	76.0	
K <sub>2</sub> Br <sub>2</sub>	g	-129.5	-135.2	69.7	19.47
KBrO	aq	-82.8	-75.9	34	
KBrO <sub>2</sub>	c	-88.10	-64.82	55.65	25.72
	aq, inf	-76.35	-63.27	63.15	
KBrO <sub>3</sub>	c	-88.80	-41.70	40.65	25.72
	aq	-57.2	-38.5	72.2	
KO <sub>2</sub> Br <sub>2</sub> · H <sub>2</sub> O	o	-242.1	-221.2	68	
KBr · 3O <sub>2</sub> Br <sub>2</sub> · 4H <sub>2</sub> O	o	-604.9	-534.2	166	
KO <sub>2</sub> Cl <sub>2</sub>	c	-201.0			
	aq	-194.4	-184.1	73.0	
KO <sub>2</sub> Cl <sub>2</sub> · H <sub>2</sub> O	c	-272.4	-241.60	60	
KCl · 3O <sub>2</sub> Cl <sub>2</sub> · 4H <sub>2</sub> O	o	-675.1	-581.1	147	
K <sub>2</sub> O <sub>2</sub> Cl <sub>2</sub>	c	-691.4	-479.6	93	
KO <sub>2</sub> Cl <sub>2</sub> · H <sub>2</sub> O	c	-196.4	-185.2	81	
K <sub>2</sub> O <sub>2</sub> Cl <sub>2</sub>	aq	-202.2	-210.9	127	
K <sub>2</sub> O <sub>2</sub> Cl <sub>2</sub> · 2H <sub>2</sub> O	c	-348.7	-321.4	125	
KCN	o	-27.0	-24.35	30.71	15.84
	g	21.7	15.34	62.67	12.51
	aq	-24.3	-25.5	47.0	
KONO	c	-100.08			
	aq	-95.2	-91.0	50.0	
KONS	c	-47.84	-42.82	29.70	21.16
	aq	-42.05	-45.55	58.0	-4.4
K <sub>2</sub> CO <sub>3</sub>	c	-275.1	-254.3	37.17	27.25
	aq	-282.48	-261.57	35.4	
K <sub>2</sub> CO <sub>3</sub> · 1.5H <sub>2</sub> O	c	-384.6	-342.4	48.8	
KHCO <sub>3</sub>	o	-230.2	-206.4	27.8	
	aq	-225.71	-207.96	46.3	
KOOCH formate	c	-152.46			
	aq	-162.03	-151.8	46	-15.8
KOOOCH <sub>3</sub> acetate	c	-172.8			
	aq	-178.48	-155.89	43.2	3.7
KOOCCH <sub>2</sub> NH <sub>2</sub> glycinate	aq	-172.60	-142.96	53.0	
KHC <sub>2</sub> O <sub>4</sub> oxalate; from HC <sub>2</sub> O <sub>4</sub> <sup>-</sup>	aq	-255.8	-224.63	60.2	
K <sub>2</sub> C <sub>2</sub> O <sub>4</sub>	c	-321.9			
	aq	-317.81			
KCl	c	-104.38	-97.79	19.74	12.26
	g	-51.18	-55.89	57.12	6.72
	aq, inf	-100.27	-99.07	39.0	-27.4
K <sub>2</sub> Cl <sub>2</sub>	g	-148.9	-148.9	83.9	19.28
KClO	aq	-85.9	-78.5	35	
KClO <sub>2</sub>	aq	-76.2	-63.8	48.7	
KClO <sub>3</sub>	o	-95.09	-70.82	94.2	29.88
	aq, inf	-65.17	-68.62	63.5	
KGO <sub>2</sub>	c	-103.43	-72.46	36.10	26.86
	aq, inf	-91.23	-69.76	58.0	
KHClO <sub>4</sub> from HC <sub>2</sub> O <sub>4</sub> <sup>-</sup>	aq	-270.2	-250.5	66.5	
K <sub>2</sub> CrO <sub>4</sub>	c	-335.5	-309.7	47.89	34.89
	aq, inf	-331.24	-309.36	51.0	
K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>	c	-492.7	-449.8	69.8	52.4
	aq	-475.8	-448.4	111.5	
K <sub>2</sub> Cu(CNS) <sub>2</sub>	aq	-102.5	-116.1	227	
K <sub>2</sub> CuCl <sub>4</sub> · 2H <sub>2</sub> O	c	-408.0	-356.8	64.86	60.52
KF	c	-185.58	-129.53	15.91	11.72
	g	-77.78	-82.13	54.14	8.42
	aq, inf	-139.82	-134.34	21.2	-20.3
KF · 2H <sub>2</sub> O	c	-276.11	-244.17	37.1	
KHF <sub>2</sub>	o	-221.72	-203.45	24.92	15.39
from HF <sub>2</sub> <sup>-</sup>	aq	-215.68	-205.88	46.5	
K <sub>2</sub> F <sub>2</sub>	g	-205.2	-204.6	75.7	18.71
9-64 K <sub>2</sub> Fe(CN) <sub>6</sub>	c	-69.7	-31.0	101.83	
	aq	-46.7	-29.0	139.1	

## Section 9

## THERMODYNAMIC PROPERTIES

Table 9-1 (Continued)  
ELEMENTS AND INORGANIC COMPOUNDS

$S^\circ$	$C_p^\circ$	Formula and Description	State	$\Delta H_f^\circ$	$\Delta G_f^\circ$	$S^\circ$	$C_p^\circ$
-53		PuN	c	-75.70	-89.18	14.20	12.75
-28		PuO	c	-135	-128.8	18.9	12.25
64.70	50.00	PuO <sub>2</sub>	c	-252.9	-240.4	16.7	18.4
64.70	49.94	Pu <sub>2</sub> O <sub>3</sub> , $\alpha$	c	-430	-411.2	33.2	31.8
		Pu <sub>2</sub> O <sub>3</sub> , $\beta$	c	-410.00	-390.12	36.4	31.3
86.87	21.48	PuOBr	c	-212.40	-204.24	29.5	20.99
53.17	33.17	PuOCl	c	-222.7	-211.27	28.00	19.99
77.78	20.30	PuOF	c	-263.80	-257.87	21.90	18.99
72.08	18.48	PuOI	c	-197.80	-191.43	30.20	21.89
76.85	18.98	Pu(SO <sub>4</sub> ) <sub>2</sub>	c	-826.00	-470.71	39.00	43.49
68.18	16.48	PuS	c	-105.00	-104.37	18.70	12.80
		Pu <sub>2</sub> S <sub>3</sub>	c	-236.60	-235.53	48.00	30.99
		Polonium					
48	26.00	Po	c	0	0	15.0	8.3
48.5	44.00		g	34.8	26.8	45.13	
76.28	87	Po <sup>2+</sup> aq. state, $m = 1$	aq		17		
89.08	22.69	Po <sup>4+</sup> aq. state, $m = 1$	aq		70		
80.80	21.47	PoCl <sub>2</sub> <sup>+</sup> aq. state, $m = 1$	aq		-138		
71.23	17.82	Po(OH) <sub>2</sub>	c		-180		
		Po(OH) <sub>2</sub> <sup>+</sup> aq. state, $m = 1$	aq		-113		
9.86	6.20	PoO <sub>2</sub>	c	-60	47	17	14.7
45.960	5.102	PoO <sub>3</sub>	c		-23		
(28)		PoS	c		-1		
(44)		Potassium					
(58)		K	c	0	0	15.34	7.07
(68)			aq	0.548	0.063	17.08	7.82
(47)		K <sup>+</sup>	g	21.33	14.49	38.30	4.87
(67)		KAg(CN) <sub>2</sub>	aq	-60.32	-67.70	24.5	5.2
(37)			c	-4.0			
(26)		KAgCl <sub>2</sub>	aq	4.3	5.3	71	
(36)			c	-134.6			
(42)			aq	-118.9	-119.2	79.8	
37		K <sub>2</sub> Ag <sub>3</sub>	aq	-164.1	-172.2	109.5	
62.6		KAgCl <sub>2</sub>	c	-286.2	-282	47	57.4
58.3		K <sub>2</sub> AgCl <sub>3</sub>	c	-497.5	-483.3	90.0	59.49
83.28	29.35	K <sub>2</sub> AgF <sub>6</sub>	c	-786.5		68	62.84
			aq	-783.8			
62		K <sub>2</sub> H <sub>2</sub> Al <sub>2</sub> (PO <sub>4</sub> ) <sub>3</sub> · 18H <sub>2</sub> O	c	-4484.4	-4681.8	895.6	254.3
		KAl(SO <sub>4</sub> ) <sub>2</sub>	c	-590.4	-595.4	48.87	48.11
		from Al <sup>3+</sup> + SO <sub>4</sub> <sup>2-</sup>	aq	-822	-640	-42.5	
(30)		KAl(SO <sub>4</sub> ) <sub>2</sub> · 12H <sub>2</sub> O	c	-1448.8	-1228.9	184.3	155.6
12.18	10.37	KAlSi <sub>3</sub> O <sub>8</sub> leucite	c	-725.2	-886.3	47.8	39.22
17.85	15.75	KAlSi <sub>3</sub> O <sub>8</sub> sanidine	c	-948.4	-893.9	55.69	49.88
19.41	11.93	microcline	c	-948.4	-894.6	51.20	49.37
26.92	18.03	KAl <sub>2</sub> Si <sub>2</sub> O <sub>7</sub> (OH) <sub>2</sub> muscovite	c	-1430.3	-1340.5	73.2	
		KAlSiO <sub>4</sub> kalsilite	c	-507.0	-479.3	31.8	28.83
12.3	8.48	KH <sub>2</sub> AsO <sub>4</sub>	c	-282.2	-247.6	37.05	30.29
42.90		from H <sub>2</sub> AsO <sub>4</sub>	aq	-277.71	-247.74	52	
-28		K <sub>2</sub> HAsO <sub>4</sub> from HAsO <sub>4</sub> <sup>2-</sup>	aq	-697.25	-306.22	48.8	
		K <sub>2</sub> AsO <sub>4</sub>	aq	-383.23	-366.10	34.8	
48.10	25.78	KBF <sub>4</sub>	c	-449.8	-426.8	38.40	28.43
40.50	22.83		aq	-436.7	-423.1	68	
38.00	24.58	KBH <sub>4</sub>	c	-54.35	-38.32	28.40	22.88
			aq	-48.51	-40.39	50.9	
27.00	23.14	KBO <sub>2</sub>	c	-234.8	-220.7	19.12	15.95
38.7	28.88		aq	-244.92	-229.97	15.6	
53.20	40.00	K <sub>2</sub> O · B <sub>2</sub> O <sub>3</sub>	c	-489.2	-441.4	38.24	31.60
14.3	9.33	K <sub>2</sub> B <sub>4</sub> O <sub>7</sub>	c	-766.9	-748.7	49.80	40.76
15.5	10.33	K <sub>2</sub> B <sub>6</sub> F <sub>4</sub> γ	c	-538.5			
61.20	28.73	β	c	-537.4			
		β'	c	-537.8			
		KBr	c	-84.12	-80.96	22.82	12.50
			aq, inf	-89.37	-82.65	44.2	-28.7

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